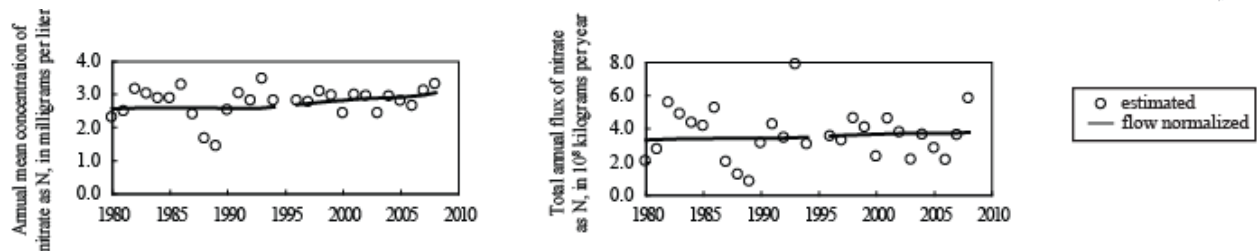


# Mississippi River below Grafton, IL



## Flow-normalized nitrate concentration and flux

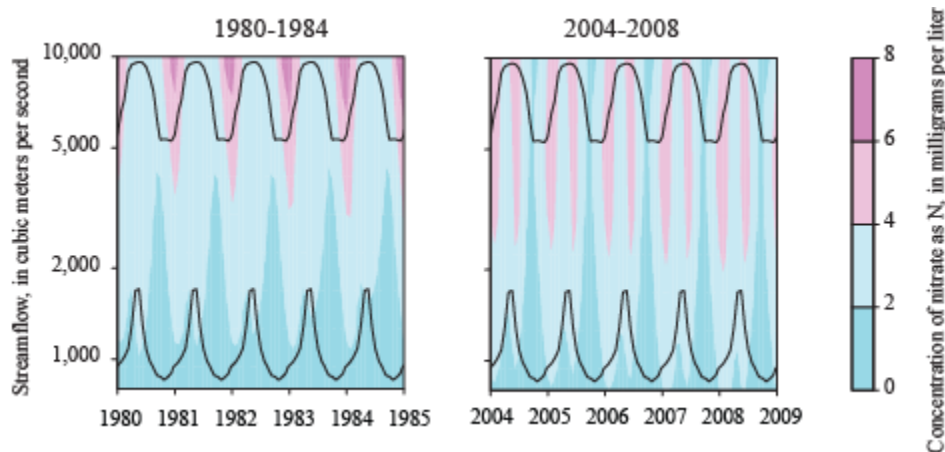
Percentage changes in flow-normalized nitrate concentration and flux between 1980 and 2008 were 19 and 14%, respectively, at Mississippi River below Grafton, IL. Flow-normalized concentration and flux gradually but consistently increased during this period.



**EXPLANATION:** Estimated concentration and flux are strongly influenced by changes in climate and streamflow. For example, concentration and flux of nitrate are different during floods than during droughts. Flow-normalized concentration and flux are independent of changes in streamflow, so they can provide greater insight into the effects of conservation practices and other changes in the watershed.

## Comparison of nitrate concentrations over time and with streamflow

Nitrate concentrations at Mississippi River below Grafton increased between the early 1980s and mid 2000s at low and moderate streamflows but decreased at high streamflows. Increases at low and moderate streamflows were greater than decreases at high streamflows.



**EXPLANATION:** These contour plots show model estimates of concentration as a function of time and streamflow for two 5-year snapshots in time—an early period from 1980 to 1984 and a recent period from 2004 to 2008. Any vertical line shows how concentration would have varied with streamflow on a particular day of a particular year; any horizontal line shows how concentration would have varied over time (seasonally and annually) at a particular streamflow. Because the probability distribution of streamflow changes from day to day, smoothed estimates of the 5th and 95th percentiles of streamflow on each day are plotted as black lines.

## Map of sampling location:

[http://waterdata.usgs.gov/il/nwis/nwismap/?site\\_no=05587455&agency\\_cd=USGS](http://waterdata.usgs.gov/il/nwis/nwismap/?site_no=05587455&agency_cd=USGS)

## Link to water-quality data:

[http://infotrek.er.usgs.gov/nasqan\\_query](http://infotrek.er.usgs.gov/nasqan_query)